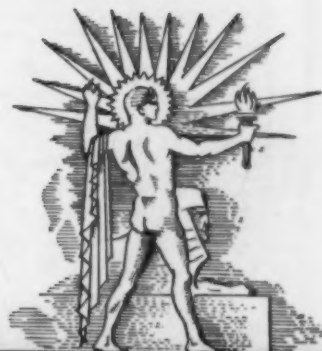
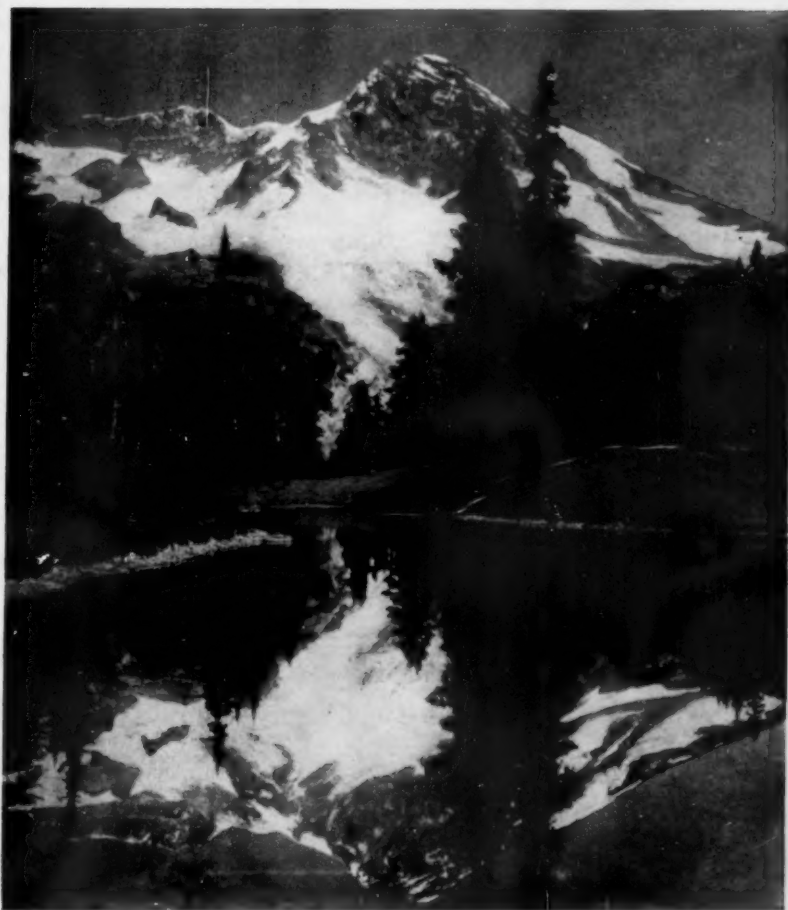


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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



SEPTEMBER 15, 1934

Once Fire, Now Ice
See Page 175

A

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DO YOU KNOW?

The name Yosemite means grizzly bear, but there are no grizzlies in the Yosemite Park now, so far as is known.

Corn ear worms are cannibalistic, the bigger worms eating up smaller ones, which is some help to the farmer in controlling these pests.

Investigations at Iowa State College have reassured farmers that corn stunted by drought has no tendency to poison livestock if fed as fodder and silage.

The New Handkerchief Geyser in Yellowstone Park amuses visitors by sucking handkerchiefs down into one vent and bringing them up by eruption in another vent.

The "phenomenal increase in consumption of tomato juice" has led the Department of Agriculture to work on the problem of producing new varieties of disease-resistant tomatoes.

About 200 new gladiolus varieties were displayed when New York State gladiolus growers met recently.

The injury known as russetting of apples takes place when the skin is slightly injured, and cells are replaced by cork cells.

Snow can be made to melt faster on highways by pouring dark earth or ashes on it: the dark-colored material absorbs more sunlight.

Seeding lawns early in September is a plan with many advantages over sowing the seed the following spring, seed specialists advise.

It is reported that the world's largest deposits of potash are to be found near the Ural Mountains, and that the Soviet Union will soon be able to produce more potash from these sources than the entire world market is now using.

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How many primary tastes are there? p. 168.

What makes music sad? p. 169.

PUBLIC HEALTH

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What plans has President Roosevelt made for the working man? p. 168.

VOLCANOLOGY

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ZOOLOGY

What view of the organism is necessary to the zoologist? p. 168.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, postpaid in the United States.

PHYSICS

Rockets Into Stratosphere Higher Than Balloons Can

Flights Leaving All Air Behind Planned By Scientist To Study Cosmic Rays and Heaviside Layer

Dr. R. H. Goddard, who has pioneered in rocket development for the past twenty years, is at Roswell, N. M., where he will resume experiments on high altitude rocket flights.

By DR. R. H. GODDARD, Professor of Physics, Clark University.

DEVELOPMENT of a rocket to reach high altitudes will be continued during the coming academic year at Roswell, New Mexico, under a grant from the Daniel and Florence Guggenheim Foundation. It is hoped that high flights with meteorological and other instruments will be obtained.

At the time the work was discontinued in 1932, short flights to study the performance of the rockets in the air and to develop the stabilizing devices had been made.

Continued in the Laboratory

No flights have been possible during the past two years, but work has been continued along a number of lines in the laboratory at Clark University, under grants from the Smithsonian Institution and the Daniel and Florence Guggenheim Foundation. Investigations have been carried on regarding materials, methods of fabrication, tests of stabilizing means, and similar matters, which will make possible a considerable saving of time in the forthcoming tests.

Flights can not be resumed immediately, as the entire experiment plant at Roswell was dismantled in 1932, and must first be reassembled and put in working order.

Will Go Higher Than Balloon

The importance of the work lies in the possibility of sending rockets equipped with recording instruments, or with instruments having short wave radio transmitters, to greater heights in the stratosphere than balloons can reach.

Such rockets will permit of more exact study of the ozone layer, which is believed to exist at an altitude of about 40 miles, and of the various so-called Appleton electrical layers of gas which

exist above the ozone layer for many miles, and which make radio broadcasting possible. There are many other investigations, notably in the field of cosmic ray research, which it is very desirable to have carried on at heights that are practically above the atmosphere.

It is likely that most of the measurements will be made either at the highest point of the ascent, or while the rocket is descending in a parachute.

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There are now so many moose on Isle Royale in Lake Superior, that it is reported these animals are eating up the scenic beauties of the island, and may presently eat themselves out of food.

PHYSICS

Next Radio Robot Balloon To Measure Cosmic Rays

By PROF. ARTHUR H. COMPTON, The University of Chicago.

THE SUCCESS of the trial flight of our radio transmitting balloon has prepared us for the next stage where the intensity of the cosmic rays will also be recorded.

Our balloon which ascended at Chicago was filled with 250 cubic feet of hydrogen. It carried a barometer, radio transmitter and batteries weighing about eight pounds. After 31 minutes the balloon had risen to 9.5 miles as indicated by the radio record of the barometer. The barometer was adjusted to silence the radio signals at this altitude but the balloon was observed with telescope as it continued to climb for another half hour.

Sixty-two minutes after leaving the earth it was seen to burst at an estimat-



COUNTERFEITING ZEUS

When lightning strikes dry sand, it fuses the particles into a many-branched tube known as a fulgurite. These lightning-stones are objects of superstitious awe in some parts of the world. The one shown here, however, is man-made: it was produced by a high-voltage electrical discharge into sand at the Pittsfield laboratory of the General Electric Company.

ed altitude of about 18 miles. Here the balloon must have been expanded to about 24 feet in diameter. No report of finding it has been received. The transmitter radiated about a half watt at 20 meters wavelength which was received without difficulty, even though, through an accident, half of the antenna was broken loose as the balloon left the ground.

The test showed the adequacy of our barometer and of the radio method of noting its readings. On this test flight, the relatively expensive cosmic ray meter was not sent up.

Two important advances in science's drive to solve the mystery of the cosmic rays are disclosed as one of the research leaders, Prof. Arthur H. Compton of the University of Chicago, is aboard ship en route across the Atlantic

for a seven months' visit to Oxford University and other European science centers.

On its next flight, the radio-speaking robot stratosphere balloon perfected in Dr. Compton's laboratory will carry a cosmic ray meter.

Seven permanent cosmic ray observation stations are to be established at

strategic mountain sites throughout the world, equipped with heavily sheathed self-recording instruments of great sensitivity. Some of these will be operated for the next eleven years in an attempt to discover whether there is a relationship between cosmic rays and the sunspot cycle.

Science News Letter, September 15, 1934

VOLCANOLOGY

Spectacular New Eruption In Kilauea's Crater

By DR. T. A. JAGGAR, Chief, Volcanological Section, U. S. Geological Survey.

HALEMAUMAU Pit of Kilauea Volcano started a major lava eruption on Thursday, Sept. 6. At 2:44 a. m. fountains were spurting up the north and northwest edges of the old bottom.

This activity was extended into a remarkable cascade of fiery lava which fell from a crack in the wall 400 feet above the bottom of the west side of the pit. The ribbons of cascading lava occupied a length of 900 feet and fell directly into the lake below. Within twenty minutes after the beginning the old floor was covered with a lake 90 acres in extent.

At 6 a. m. the cascade went out of action but the fountains continued all day. At noon the lake was 65 feet deep and was developing benches around the edges. After 3 p. m. the eruption appeared to diminish rapidly.

The general character of the present eruptive action is like that of other recent eruptions, which have usually continued from one to three weeks. The estimated volume of lava poured out since the outbreak began is 9,500,000 cubic yards.

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VOLCANOLOGY

Kilauea Has Never Been Dangerous Volcano

KILAUEA, watched in its spectacular new eruption by Dr. T. A. Jaggar of the U. S. Geological Survey, is not expected to do any harm to human life—unless some over-bold spectator ventures too near its boiling pool of liquid rock in Halemaumau Pit. Karl Sapper, noted German authority on volcanoes,

has listed all lives claimed by erupting volcanoes during known history, and finds that the last time a Kilauea eruption slew any human victims (aside from those who have gone into the crater looking for trouble) was in 1789. At that time about eighty natives were overcome, apparently by a cloud of red-hot particles.

Kilauea's relative harmlessness is due to the fact that it is predominantly a "lava" volcano, without the violently explosive steam outbursts such as that of Vesuvius that wiped out Pompeii, and of Peleé that decimated the population of Martinique in our own time. Its lava tides rise relatively quietly, and when they do erupt from cracks in the side of the mountain simply flow over the countryside until the source is exhausted. For this reason, the volcano has never developed a towering cone-shaped peak, the commonly accepted concept of a volcano. It is of the type known among geologists as a "shield volcano"—a very wide, gradually rising circle, with the great gaping crater near the center. Its altitude is not great: only 4,100 feet, quite dwarfed by the 12,625 feet of its gigantic neighbor volcano, Mauna Loa.

Most of Kilauea's activity takes place within its gigantic crater, in a depression near one end of the floor, known as Halemaumau Pit. Here the lava seethes and bubbles practically ceaselessly, its level sometimes falling until the pit is almost empty, again rising, as in the past few days, in majestic fire-works of incandescent fountains and vast wall-cataracts of glowing liquid stone.

Science News Letter, September 15, 1934

A zoologist reports finding 131 kinds of birds at various times in "barren" Death Valley.

PHYSICS

Cosmic Rays Studied 820 Feet Under Water

LATEST evidence that cosmic rays are, in part, composed of electrical particles comes from under-water depths of 820 feet. Sending down cosmic ray measuring instruments in the Red Sea comparable with the descents of Dr. William Beebe in the Barton-bathysphere, the Dutch physicist Prof. J. Clay recently reported studies supporting the view that the mysterious cosmic rays are at least partly of a particle nature.

Dr. W. F. G. Swann, director of Bartol Research Foundation, has just reported to the *Physical Review* that Dr. Clay's work confirms his expressed belief that swift cosmic ray particles having energies of 10,000,000,000 volts fail to produce any ionization effect in the matter which they penetrate.

If this situation exists, Dr. Swann indicates, studies of cosmic ray ionization in instruments sunk deep in water should decrease gradually with depths. Dr. Clay's measurements show that such is the case down to 200 meters, or 656 feet.

At this stage far below the surface of the water, Dr. Swann predicted, the energy of the ten billion volt non-ionizing cosmic rays should be so decreased that they will enter a region in which they become capable of ionizing the gas inside the cosmic ray instruments.

Thus the ionization curve for great depths should increase at a certain point and in a short additional distance fall to zero. The curve of depth plotted against cosmic ray ionization looks like a giant fishhook; first falling rapidly, then rising a little and finally stopping entirely.

Dr. Clay found by experiment that the cosmic ray ionization showed the predicted hump, or maximum. At 656 feet, the curve rose; it reached the predicted maximum at 820 feet below the surface. Sixty-five feet farther down the ionization fell to zero.

This new evidence, taken with studies of the latitude and directional effects of cosmic ray intensities, improves the argument that cosmic rays contain high-speed, great-energy electrical particles.

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Ninety per cent of the persons who die of heart diseases are over forty years of age.

MEDICINE

Dyes Raise False Hopes In Leprosy Treatment

Leprosy Authority Says Brilliant Coloring Substances Not Effective; How Disease is Transmitted Still Unknown

THE RECENT report of the "cure" and "control" of leprosy through treatment with various dyes is an example of a spectacular method of disease treatment that does not fulfill the original claims made for it, Dr. E. B. McKinley, dean of the George Washington University School of Medicine, commented in response to a request by Science Service.

"Here is one of the most tragic diseases known to man, the social and economical implications of which are extremely profound," Dr. McKinley said. "To raise false hope in these patients is not only inhuman but therapeutically detrimental to them since the mental attitude of these patients towards their course of treatment is an important factor in their clinical progress. A new disappointment does not contribute to their morale."

So far as is known dyes for the treatment of leprosy were first employed in the Philippines about twelve years ago, according to Dr. H. Windsor Wade, Medical Director of the Leonard Wood Memorial and Editor of the *International Journal of Leprosy*. This work was not followed through to any definite conclusion.

Preliminary Report Hopeful

In June, 1933, Dr. Gordon A. Ryrie, Medical Superintendent, Federal Leper Settlement, Sungei Buloh, Federated Malay States, reported upon the use of various dyes, such as trypan blue, brilliant green, fluorescein, eosin, methylene blue, crystal violet, and many others in the treatment of leprosy. Intravenous injections of these various dyes were given to a total of 85 patients. Dr. Ryrie reported that with a few of these dyes there seemed to be a definite diminution of the "external manifestations of leprosy" which were "accompanied by other signs of clinical improvement." However, Dr. Ryrie requested that his report be considered "preliminary" in nature and suggested further trial.

By October, 1933, four months after this first report, Dr. Ryrie stated in the *International Journal of Leprosy* that he did not think that the experiment had reached the stage at which it is of therapeutic value, for he had found that about forty per cent. of those patients who improved during treatment with the more successful dyes had definitely relapsed, the lesions of leprosy appearing on the same spots from which the old ones had retrogressed, or partially disappeared.

Commenting upon this work of Dr. Ryrie, the editor of the *International Journal of Leprosy* stated that "Even if dye therapy may not produce complete cures, it may well prove to be highly advantageous if in any proportion of

cases it will cause rapid recession of lesions to a certain point, provided that improvement can be continued from that point by more ordinary, slower methods." However, he also stated, care should be taken lest extravagant expectations be aroused on the part of patients and the public at large during this uncertain, experimental phase of the matter. In this Dr. McKinley expressed hearty agreement.

More recently a new claim has been made that a dye treatment will prevent or lessen the contagiousness of leprosy. This is manifestly an extravagant claim and one entirely without foundation for, as yet, we do not know how leprosy is transmitted from patient to patient, Dr. McKinley said. If leprosy is contagious, as we believe, it is only mildly so and such claims as these, not founded upon scientific demonstration, are not to be taken seriously either by physicians or the public.

That various dyes may eventually prove to be useful in the treatment of leprosy is possible but for the present it must be stated that their use has not been acceptably established and the work so far reported is only suggestive. Dr. McKinley therefore suggested that



CLOUDS SHOW HOW THE WIND BLOWS

There are no straws to show how blows the wind in the upper air, but there are clouds. By studying their reflections on the black glass of the instrument called the "nephoscope," meteorologists can gain information about direction and velocity of winds high above the mountain-tops; this is of value to aviators and weather forecasters. The nephoscope is playing an important part in the present International Cloud Year. The cloud prominent in the above picture is of the type known as lenticular strato-cumulus; it is very rare except in mountainous regions.

false hopes should not be raised in the minds of these patients or the public.

"It is perhaps only natural that new and spectacular methods of treatment and control of human diseases should be given prominence in the daily press," Dr. McKinley commented. "More frequently than not, however, such new cures and spectacular methods of control are later found to reach far short of the original claims which have been made for them. This has been experienced over and over again in the case of cancer—and is so true in this particular instance that, up until the pres-

ent at least, it has been possible to say, upon reading such extravagant reports—'of course this is untrue.'

"The very odds against the truth of such reports makes the doubt of truth practically a sure wager. Such stories, however, not founded upon fact and careful scientific judgment and control, have their tragic side particularly for those unfortunate individuals who are victims of the disease in question. New hope is raised which is turned quickly into a further disappointment when the true situation becomes known."

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PSYCHOLOGY

Motion Pictures Sway Moral Attitudes of Children

Young Audiences Tend to Approve Actions of Film Characters, Regardless of What They Do

MOTION pictures change the moral attitudes of school children, and changes in the direction of laxer standards appear more frequently and last longer than those in the direction of stricter standards, it is shown by an experiment reported to the New York meeting of the American Psychological Association today by Dr. Vernon Jones, of Clark University.

Four regular theatrical pictures were used in the experiment: "The Champ," "Fast Companions," "Abraham Lincoln," and "Tom Brown of Culver." Three large 7th grade classes of public school children, totaling 140, took part in the experiment. Half the children were taken en masse to a theatre to see the films; the other half remained at school.

Questions designed to reveal the attitudes of the children, some of them affected by the films and some not, were asked all the children before and after the film showing, and half a year later.

The greatest changes in attitude were in connection with those attitudes affected by the pictures shown, and in the direction to be expected from the nature of the emphasis in the picture.

"In the film, 'Fast Companions,' a young boy is shown stealing food on several occasions, and this is always treated with a mixture of humor and sympathy," Dr. Jones related. "One of the items on the test was, 'H steals something to eat if he is hungry.' The

rank assigned this item after seeing the picture changed more than that for any other item in the test, and naturally it changed in the direction of considering this behavior more excusable.

"The emphasis in a picture is determined not only by the acts performed but also by the total personality of the actor. For example, in 'Tom Brown of Culver,' the hero did many praiseworthy things, but he was notably lacking in courtesy and agreeableness. On the test following the picture, we find the importance of courtesy and agreeableness to have decreased."

In the film "Abraham Lincoln" the character of Lincoln was exalted. The average rank assigned to Lincoln by the group who saw the film was decidedly higher after the showing of the film. The attitudes of the others remained unchanged.

In three out of five items, the change of attitude caused by the film was completely lost after a half-year's time. In the others there was partial loss or no loss. The changes that were maintained best were those in the direction of laxer standards. The change in favor of Lincoln was one that was lost completely, but on the following item the change was maintained 100 per cent.: "D lied out of something wrong which he did and thereby protected his family from the disgrace which it would have caused."

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HISTORY OF EDUCATION

Bathtubs And Science Entered College Together

BATHTUBS and recognition of science won their places in the conservative colleges of Great Britain at about the same time. With a chuckle over "this interesting coincidence of sanity and sanitation," Dr. H. T. Tizard, chairman of Britain's Aeronautical Research Committee, illustrated an address on Science at the Universities with reminiscences of his early education during Queen Victoria's reign.

"I was at a public school at a time when to take an interest in science was held to be a sign that you were not quite a gentleman," said Dr. Tizard. A "public" school in England corresponds to the more exclusive kind of "private" school in America. "At my school there were 'close' scholarships to Oxford and Cambridge, but I was soon given to understand that these were not available for boys on the science side. . . . It does not seem so very long ago to me; yet the changes that have taken place since then are so profound that it is now considered quite respectable to be a scientist, even at a public school."

The extent of the swing of the pendulum of the British public's esteem for science has an index in the number of students now engaged in scientific study, and the willingness of Parliament to grant financial support.

"There are now about 50,000 students in the universities of Great Britain, half of whom are studying some form of natural science," the speaker continued. "This growth has been only made possible by the provision of public money; all universities in this country are now dependent on the taxpayer and ratepayer. The State alone provides annually for university education a sum nearly ten times as great as was provided before the war; and local government bodies, in addition to their direct contributions, find large sums for maintenance allowances to students.

"The student of science has to be provided with laboratories, where he consumes power, heat, light, and expensive material. He is in consequence the most costly of university students: I estimate that the public expend, in one way or another, nearly £200 a year on each student of science, with the possible exception of students at Oxford and Cambridge, who are more richly endowed from private sources."

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GEOLOGY

Scientists Determine New Figure For Age of Earth

In Strife-Torn Austria, Analysis of Canadian Rock Is Basis for Estimate of 1,725,000,000 Years

By DR. ALFRED C. LANE, Tufts College.

FROM strife-torn Austria comes new scientific evidence that the age of the earth is not less than 1,725,000,000 years. Thus does the city of Vienna maintain the heritage which has made it a great scientific center in the past.

From correspondence with scientists in Austria I have just learned that while troops roamed the streets outside, investigators at the University of Vienna have completed an analysis of radioactive rocks from near Winnipeg, Canada, which provides the new insight into the age of the earth.

The method of determining the age of rocks and mineral from the amount of radioactive material they contain, and the ratio of such material to the amount of lead present has been frequently described. The process (often referred to as the radioactive "timeclock" method) is in many ways like finding out how long a popcorn machine has been running by determining the proportion of popped to unpopped corn in it.

By analogy, the unpopped corn would be the radioactive material present in the rock which has not, as yet, disintegrated. The popped corn would correspond to the products of disintegration, principally radioactive lead.

Some time ago, Dr. H. V. Ellsworth, the expert of the Canadian Geological Survey in such matters, analyzed a sample of the mineral uraninite from near Winnipeg, Canada. He found a large proportion of lead present compared with the radioactive element uranium.

The ratio, in fact, was so large that he suspected some of the lead might not be of radioactive origin; or that despite its fresh appearance some uranium might have been removed from the rock during the billion and more years it had remained in its location. Either happening would have produced the surprisingly large ratio of lead to uranium.

During the last few years in the laboratory of Prof. A. Franke at Vienna,



SHE KNOWS EARTH'S AGE

While revolution upset Vienna, Miss Edith Kroupa, research chemist working with a new method of microchemical analysis in the laboratory of Prof. A. Franke at the University of Vienna, analyzed a sample of radioactive rock from near Winnipeg, Canada. From her determinations Prof. Alfred C. Lane of Tufts College, chairman of National Research Council Committee on Determination of Geological Time, estimates that the rock is 1,725,000,000 years old.

Dr. F. Hecht and his assistant, Miss Edith Kroupa, have been making a special study of the use of chemical micro-analysis. This is simply a method of obtaining an accurate determination of the amounts of materials in a substance when the total amount of sample is very small.

It was believed that the Viennese micro-methods would prove useful in checking the findings of Dr. Ellsworth. Accordingly the Canadian investigator sent to Vienna four-tenths of a gram (about a hundredth of an ounce) of monazite which was associated with the uraninite sample. Monazite contains thorium, another radioactive material which ultimately, if given long enough, changes into a form of lead.

Working with this almost microscopic

speck of material Miss Kroupa, guided by Dr. Hecht, made the microanalysis. Using their results one can compute that the rock from Winnipeg is beginning to approach two billion years of age. A fair estimate of its antiquity is probably some 1,725,000,000 years. Other data as to the rate of disintegration of thorium into lead might make the result as high as 1,820,000,000 years.

One can not be too fussy about a few million years when a minute error in weighing will produce such a difference. Miss Kroupa's data essentially substantiate the findings for the age of rocks elsewhere in the world. Minerals obtained at Sinyaya Pala in North Carelia, Russia, have been assigned the age of 1,850,000,000 years, for example.

The Viennese work, therefore, makes it highly probable that the Winnipeg minerals are the oldest yet known, at least on the North American continent.

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PHYSICS

Compass Needle Swings Aside During Eclipse

ONE of the less-known but strange experiments performed by the Japanese scientists during the total eclipse of the sun in the Pacific Ocean last February was to determine if the cutting off of the sun's rays by the moon would change the magnetic field of the earth.

Commander Akiyosi of the Japanese Naval Hydrographic Office found such an effect, reports Dr. Josef J. Johnson of California Institute of Technology, who was one of two Americans accompanying the expedition to the Pacific. Dr. Johnson describes the magnetic experiments in the journal, *Popular Astronomy*.

"Commander Akiyosi's apparatus," Dr. Johnson relates, "in principle at least, consisted of a small mirror attached to the needle of a compass. A narrow beam of light was directed upon this mirror, from which it was reflected to a sensitized paper slowly moving over a revolving drum. Any changes in position of the needle were easily detectable. During the eclipse the needle rotated slightly, the north end coming to the east by about one minute of arc, then going back to its original position at the end of totality. It seems strange that an eclipse should affect the compass but such was actually the case."

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PSYCHOLOGY

Salt is Not a Taste, Psychologist Declares

SALT is not a taste. Evidence that this common food ingredient is not tasted but rather felt by some special skin mechanism was presented to the American Psychological Association by Dr. Samuel Renshaw of Ohio State University. Thus the four traditional primary tastes, sweet, salt, sour and bitter, are probably now narrowed to three.

The taste of food and drinks are greatly affected by their temperature, Dr. Renshaw has found. Hot drinks are best at a temperature of 132 degrees Fahrenheit; cold drinks at about 59 degrees. A large soft drink manufacturer has found temperature so important to sales that inspectors are sent around to check on the coldness at which vendors serve the beverage. An increase of but a few degrees in the temperature of the drink means a drop of as much as twenty per cent. in sales.

At a neutral temperature of about body warmth, tastes diminish. Salt, however, does not follow this rule: it is noticed more in lukewarm foods than in hot dishes. Also it can be noticed on the lips and gums of the mouth where there are no taste organs.

Science News Letter, September 15, 1934

ZOOLOGY

Behavior of Whole Animal Recommended For Study

"MIND" and "matter" in living organisms are not separated and opposed things that act upon (and against) each other; the organism is a single continuous unity, and its behavior is a unified, not a dualistic, phenomenon. Zoologists who wish to learn something about the ways of the animals they study must approach their problem from this angle if they are to hope for success, and not depend entirely upon a chopping-to-pieces analysis based on the assumption that behavior is just a complex of chemical reactions and nothing more.

A thesis in support of this "organismal" point of view was advanced and defended before the zoological section of the British Association for the Advancement of Science by its president, Dr. E. S. Russell, director of the Fisheries Station at Lowestoft, England. Zoologists have left the development of this renewed understanding of the "or-

ganismal" concept too much to psychologists and physiologists, he said; they should recapture some of it for themselves, especially the study of behavior under natural conditions in the field, for which they are by training especially fitted.

The idea of a matter-mind dualism in animal behavior, Dr. Russell stated, is a relatively new development. Aristotle, the first great scientist of whose work we have anything like a connected record, knew nothing of it. Aristotle was a "first-rate field naturalist and observer." The dualistic concept started with the founder of modern systems of formal philosophy, Descartes, whom the speaker characterized as "primarily a mathematician and a theologian."

Science News Letter, September 15, 1934

PUBLIC HEALTH

Medical Care Urged For Social Insurance Plan

MEDICAL care for the working men and women of America will be included in the scheme of social insurance which President Roosevelt will ask Congress to consider at its next session, if the earnest hopes of health authorities throughout the country are to be fulfilled.

This was indicated in the address of Dr. J. L. Pomeroy, health officer of Los Angeles County, Calif., before the American Public Health Association at Pasadena.

The federal government's recovery program should include subsidies to the states and counties for rehabilitation of their health departments similar to the subsidies given from welfare funds, in Dr. Pomeroy's opinion. The government has wasted millions of dollars trying to cure diseases which could have been prevented by expenditure of a few thousands, he declared.

"Public health is one of the few instruments of social justice which has not broken down, which has not required special government codes for regulation, which has not required special regimentation, and above all, which has kept faith with the American people," he pointed out.

Government assistance and the cooperation of health officers and practising physicians are needed to prevent failure of health service to the men and women of America.

Science News Letter, September 15, 1934

IN SCIENCE

PALEONTOLOGY

Fifteen-Ton Dinosaur Had One-Ounce Brain

FIFTEEN tons of lumbering body: One ounce of bewildered brain. Such is the startling contrast that characterizes the remains of a 140-million-year-old dinosaur partly uncovered by the American Museum-Sinclair Dinosaur Expedition working at Question Mark Quarry near Billings, Mont., under the direction of Dr. Barnum Brown.

The vast but nearly brainless beast had a body-to-brain weight ratio of approximately 580,000 to 1. By contrast, a 200-pound man has a similar ratio of only about 70 to 1.

Science News Letter, September 15, 1934

ARCHAEOLOGY

Early Florida Indians Buried Like Christians

BURIALS of some of the earliest Christianized Indians in the United States are being explored near the shore in the region where the Spanish discoverer Ponce de Leon first saw Florida and gave the land its flowery name.

A stone's throw from the "Fountain of Youth" in St. Augustine the graveyard came to light, and some 90 skeletons of Indians of all ages have so far been uncovered.

An archaeologist formerly with the University of Illinois, John R. Dickson, is removing the earth around the bones, leaving each skeleton in its relative place. That many of these Florida Indians were Christian is shown by the arms crossed as in prayer, of some of the skeletons. Absence of the offerings and belongings poured into the pits of old Indian burials for future use by the dead is another sign that these red men had renounced their native religion. Only beads and some scraps of clay pottery have been found with any of the dead buried here. Some of the beads are of typical Indian make, whereas others are yellow and blue beads such as the Spaniards brought to trade for Indian goods.

Science News Letter, September 15, 1934

SCIENCE FIELDS

CHEMISTRY

Butane Found Rich In Heavy Hydrogen

A NEW source of the much-sought heavy form of hydrogen, known to chemists as deuterium, has been found in the gas butane, occurring in natural gas fields.

In a report to *Science*, Dr. R. D. Snow, petroleum chemist, and Prof. Herrick L. Johnston of the Ohio State University department of chemistry declare that not only is deuterium present in butane but there is thirty per cent. more of it present in this gas than there is in a comparable volume of commercial hydrogen.

Science News Letter, September 15, 1934

METEOROLOGY—RADIO

Thunderstorms Shatter Radio "Mirrors"

THUNDERSTORMS shatter the radio "mirrors" of electrical particles hundreds of miles above the earth and bring bad luck to radio listeners in the form of poor reception. This, in substance, is the report of J. A. Ratcliffe of Cambridge's Cavendish Laboratory to the British Associate for the Advancement of Science.

The radio "mirrors," which reflect radio waves and makes possible transmission over long distances, are in the ionosphere. Each mirror is a layer of air atoms split apart and in this way electrified. Radio waves bounce off the under side of these layers and are reflected back to earth.

Mr. Ratcliffe used radio signals to study the height of such reflecting layers during thunderstorms. The method is essentially an "echo" one and similar to the system of determining the depths of the ocean by sending sound waves and waiting for the echo. The one difference is that radio instead of sound waves were employed.

The Cavendish Laboratory investigator found that one electrical layer, designated by the symbol E, was 78 miles above the earth before a thunderstorm

arrived. During the storm the electrical discharge pushed the layer down to 65 miles.

With the cessation of the storm the height of the layer rose again to 78 miles but within fifteen minutes it mounted to 93 miles. The electrical reflecting surface, therefore, undergoes great oscillatory motion during the storm.

Because of the up and down motion the fidelity of radio reception varies during the thunderstorm just as a beam of light reflected from a still pool is greatly different from that reflected by the water in the pool when waves are stirred up in it.

Science News Letter, September 15, 1934

PSYCHOLOGY

Sadness of Music Depends on Rhythm

WHETHER a musical composition is sad or happy, serene or exciting, graceful or vigorous, depends upon certain structural elements in the music, Dr. Kate Hevner, of the University of Minnesota, stated before the annual meeting of the American Psychological Association.

To trace the origin of such emotional or mood effects, Dr. Hevner prepared two versions of a musical composition which differed in one respect only, either in rhythm, in harmony, or in the melody. These two versions were presented to two different groups of listeners each of which described the version heard.

Firm rhythms were described as vigorous, dignified, and sad; flowing rhythms as happy, graceful and sentimental; but the firm or flowing character of the rhythm seems to be unrelated to such qualities as excitement and serenity.

Simple consonant harmonies were found to give the impression of being happy, graceful and serene, and complex dissonant harmonies are vigorous and exciting. The use of augmented intervals, especially, increases the exciting, restless qualities, it was found.

Descending melodies are considered more graceful and lyrical, and rising melodies more dignified and possibly more vigorous, although this element is probably not so important in determining the expressiveness of music as is the rhythm, the harmony, and whether it is major or minor.

Science News Letter, September 15, 1934

CHEMISTRY

High Pressure Bearings "Skate" on Lubricants

BEST lubricants allow motion between two pieces of metal when they act in the fashion of a small boy skating on ice. To reduce friction under conditions of high temperature and pressure a good lubricant should be a solid; but such a solid that it turns to a liquid when under a load.

Reporting to the American Chemical Society, Dr. Robert C. Williams of the Ironsides Company declared where high pressure and extreme temperatures occur the best lubricants are not the conveniently paste-like greases but solid wax-like materials.

Such lubricants, he declared, act very much as ice does under the runner of a skate; they turn to a liquid and then back to the solid form. He recalled that one really skates on a film of water formed by the pressure of a skate runner. The water turns back to solid ice as soon as the pressure is removed.

Desirable properties of lubricants, as summarized by Dr. Williams: 1. They should adhere firmly to at least one of the two surfaces between which the rubbing occurs; 2. They should remain in a solid form prior to the motion of the two parts; 3. They should turn quickly to a mobile liquid as soon as sliding under load occurs.

Science News Letter, September 15, 1934

PSYCHOLOGY

Psychological Method For Trapping Criminals Urged

WHEN police give a criminal the third degree, his replies may not betray him, but his involuntary muscle movements may. A psychological method of trapping suspects which was developed in Russia to take advantage of this fact is urged for trial in America by Dr. Harold E. Burr, of Ohio State University.

When the suspect is questioned, he is asked to press an electric key at the same time that he gives his answer. If the question relates to his guilt, that fact is often revealed in the record of his muscular reactions as he presses the key, or, in his preoccupation, he may forget to press it at all.

The tale of his guilt is thus revealed in the tell-tale marks on the psychologist's photographic record.

Science News Letter, September 15, 1934

PHYSIOLOGY

How Sprees Ruin Nerves

Researches of Young Virginia Scientist Show Details Of Nerve Behavior Under Severe Alcohol Poisoning

By JANE STAFFORD

THOSE LONG cool drinks you sipped in this first summer of repeal—what have they done to your nerves?

The answer—learned from a study of tadpoles—depends on how you did your drinking. One mint julep at the end of a hot day or even every hot day probably did not affect your nerves, but if you went on a spree every week-end or holiday, the answer is quite different.

A little daily drinking of alcoholic beverages, even when done over a prolonged period of time, does little or no perceptible harm to your nerves. The damage, if any, is soon repaired. But the amount of alcohol consumed on a spree may permanently damage these important tissues.

These facts are the latest scientific discoveries about the effects of alcohol on the body.

Medical scientists have long known in a general way that the nervous system and the digestive tract are the only parts of the body affected to any extent by alcohol as a beverage. You don't have to be a scientist to know that alcohol dulls the senses, slows the mental processes and the coordinating mechanism between mind and muscles. Unless you are a scientist, however, you may not realize that these results of drinking alcohol are evidence of the drug's effect on the nerves. (Alcohol taken internally may be a beverage to you, but it is a narcotic drug to the scientist.)

What Alcohol Does to Nerves

Because the mental processes, the senses, the coordinating mechanism, and control of muscles and movements are intimately related to the proper functioning of the nerve cells, it is important to know just what happens to the nerves during alcoholic intoxication.

Prof. Carl C. Speidel of the University of Virginia has now found the exact changes which alcohol produces in the very structure of the nerves. His studies will probably explain why a drunken man can not walk or talk

straight and is more or less insensible to pain.

For years Prof. Speidel has been watching the behavior of nerves in living organisms. He used small frog tadpoles because their nerves are constructed essentially on the same plan as man's and because the transparency of their tail fins makes it easier to study them in place. What he did was anesthetize the animal slightly and place it on a specially prepared microscope slide. Then, using very high magnification, he observed the individual nerve fibers in the transparent tail fin.

From this observation Dr. Speidel made a map of the nerves in each tadpole's tail. The animal was then put back into pond water and on the next day the same region and the same nerves were studied again. By this method he obtained histories of individual nerve fibers over a period of several months. He learned how nerve fibers grow through living tissues, how they repair themselves when injured, and, most recently, how they are affected by alcohol. He has even taken moving pictures of the nerve growth so that he could show it to fellow scientists.

Pioneers of Growth

As pictured and explained by Prof. Speidel, nerve growth is pioneered by what are known as "growth cones" on the ends of the nerve fibers. These are thickenings of the tips which probe their way through the tissues, constantly sending out and recalling tiny processes from their surfaces, like finger-tips feeling their way. As the nerve progresses special cells develop along its course. They hug the sides closely, though they take no part in its actual growth process, nor in its function as a nerve. These are known as the "sheath cells." Finally, as the nerve becomes more mature, it develops around itself a layer of fatty material called the "myelin sheath."

"A conspicuous feature of mature fiber is the myelin sheath, a fatty covering which encases the nerve fiber and protects, insulates and nourishes it," Prof. Speidel explained.

"This sheath is in the form of segments arranged somewhat like a string of sausages. As it responds quickly to irritation of almost any sort, it is an excellent indicator of alcohol effects. It may degenerate or partially degenerate even though the nerve axis within it remains alive. It never persists, however, if the nerve axis degenerates.

"It occurred to me that it might be interesting to watch nerve fibers while the tadpole was subjected to prolonged and repeated intoxication by alcohol. This proved to be entirely feasible. My records now include many case histories of nerve fibers which demonstrate that practically all gradations of irritation and injury may be induced by alcohol treatment."

Movies of Living Nerves

Prof. Speidel has made motion pictures directly from living animals showing such irritated nerve fibers.

"Poisoning of nerve cells by alcohol depends upon the concentration of alcohol in the blood and body fluids," he continued in his explanation of his latest findings.

It matters little how the alcohol enters the body. In the tadpole it was given by way of the skin. Alcohol permeates the moist skin of the frog tadpole readily, he found. In this respect the tadpole's skin can be compared in the lining of the alimentary tube of man.

Prof. Speidel sought answers to the following questions:

(1) Do visible structural changes take place in nerves during alcoholic intoxication?

(2) Can complete degeneration of myelin sheath segments be induced?

(3) Does repeated alcoholic intoxication stop the addition of new myelin sheath segments in a developing zone?

(4) Does repeated alcoholic intoxication stop nerve sprout growth?

(5) What are the relative effects of prolonged continuous intoxication (the "spree" type), and of short daily intermittent intoxication continued, however, over long periods?

In very dilute alcohol, less than five-tenths of one per cent., Prof. Speidel found that tadpoles may live indefinitely with little or no indication of any special nerve irritation. In much stronger alcohol solutions, more than three

per cent., death usually ensues within an hour or two. The skin suffers direct injury in these cases.

Alcohol solutions in the neighborhood of two per cent. brought on marked changes in the nerves, such as marked swelling, undulating movements of the myelin sheath, appearance of vacuoles or spaces between the myelin sheath and the enclosed nerve axis followed by gradual separation of these structures, assumption of an irregular wavy course by the nerve axis, and formation of myelin globules and ovoids.

In one case an animal was kept in two and one-half per cent. alcohol for five hours. At the end of this period it was dazed and could be examined without the use of any anesthetic. The speed at which the blood circulated was markedly less than normal. A long nerve fiber was seen with its myelin sheath in process of degeneration. The last thirteen myelin segments were already breaking up into fragments. The ones on the side toward the body were all greatly swollen and showed definite separation of the myelin sheath from the nerve axis.

Replaced in Water

The animal was replaced in pond water, and the process of its recovery watched. During the next two days, two more of the swollen myelin segments broke up into ovoids. The others slowly recovered. At many points on these recovering segments, however, small myelin globules were cut off, an indication of the strong irritation to which the nerve fiber had been subjected, Prof. Speidel explained. During the next two months, new nerve sprouts grew from the irritated fiber to make entirely new connections with the skin. New myelin segments also appeared along the nerve to which the fiber belonged, under the influence of the sheath cells of the degenerated segments.

Separation of the myelin sheath from the nerve axis is a feature of strong alcoholic intoxication. According to one theory, the surface junction of the myelin sheath and the nerve axis plays the chief role in conducting nervous impulses.

"If this be true," commented Prof. Speidel, "my observations on tadpole nerves reveal a direct structural basis for the explanation of the functional disturbances associated with strong alcoholic intoxication."

In other words, the reason why a



TEMPERANCE LESSONS FROM TADPOLES

Prof. Carl C. Speidel in his laboratory at the University of Virginia, preparing to watch the growth of a nerve in the transparent tissue of a tadpole's tail. If the tadpole is kept alcoholically intoxicated too long, the nerves degenerate.

drunken man can not walk or talk straight and is more or less insensible to pain may be that the sheath has separated from the axis of certain of his nerves.

The structural changes brought about in the nerve fibers are not specific to alcohol but are due to the irritation it produces and can be brought about by other irritants.

The complete degeneration of myelin sheath segments by strong alcoholic intoxication is permanent, but the slight irritative changes from mild daily intoxication of brief duration are quickly repaired, Prof. Speidel found. New sprout growth and new formation and growth of myelin segments may take place on fibers subjected to such lesser irritation.

One Long "Spree"

One interesting case was that of a tadpole under strong intoxication following immersion in two per cent. alcohol for 21 hours—a good long "spree," in fact. This animal showed incipient degeneration of two of the last segments on a nerve fiber. When the tadpole was replaced in pond water these segments recovered in a few days.

Thereafter for nearly three months the animal received enough alcohol once a day to stun it. Temporary irritation of the fiber was usually visible during the treatments. However, the fiber readily recovered each day between

treatments and remained fairly normal in appearance. Moreover, the youngest myelin segments grew somewhat, and three new segments were added to the fiber. Some new nerve sprouts were also formed.

"This case and others of similar nature suggest that daily intoxication of brief duration is not enough to cause degeneration of either myelin sheath or nerve axis," Prof. Speidel concluded. "Nor is it sufficient to prevent the growth of nerves in regenerating zones."

It was the study of nerves in the living tadpoles that enabled Prof. Speidel a few years ago to show for the first time that nerves sprout from the spinal cord and, like telephone wire strung from a central office to a home, go directly to the muscle or sense organ they are destined to connect with the central nervous system. For this demonstration Prof. Speidel received the \$1,000 annual prize of the American Association for the Advancement of Science. As a result of his demonstration, science must set about to answer a fundamental question of life; How does the nerve grow with seeming intelligence and travel unerringly to its destination?

Growth After Injury

Growth after injury as well as normal growth of nerves was studied by Prof. Speidel before he undertook the alcohol study. Unlike a telephone line,

nerves can not be patched when cut, but the break must be remedied by an entirely new outgrowth from the place of the cut to the muscle or sense organ controlled. It is just as though a telephone linesman were unable to use any of the old wire between the place of a break in the line and the subscriber's telephone and had to string entirely new wire.

This explains why when a finger or leg suffers a serious cut it may take weeks and months for normal feeling to be restored in it and why muscles have to be reeducated.

How Alcohol Affects the Body

Prof. Speidel has found how alcohol affects the nerves. Other effects of alcohol on which medical scientists agree have been summed up in a recent book by Prof. Haven Emerson of Columbia University as follows:

1. Alcohol is a narcotic which, by depressing the higher centers, removes inhibitions.
2. Outside of the nervous system and the digestive tract, alcohol used as a beverage has little demonstrable effect.
3. It is a food, utilisable as a source of energy and a sparer of protein, but it is such only to a very limited extent.
4. It is improbable that the quality of human stock has been at all injured or adversely modified by the long use of alcohol, although the effects on the individual are often devastating.
5. The therapeutic usefulness and value of alcohol is slight.
6. It may be a comfort and a psychological aid to the aged.
7. It does not increase, and it sometimes decreases, the body's resistance to infection.

Releases Inhibitions

8. By releasing inhibitions, it makes for social ease and pleasure, and herein lies one of its great dangers.
9. Its effects are best studied by changes of conduct.
10. It impairs reason, will, self-control, judgment, physical skill, and endurance.
11. It may produce situations from which crime and social lapses result.
12. It is a frequent destroyer of health, happiness, and mental stability.
13. Its use commonly lowers longevity and increases mortality.
14. It is used primarily for its psychological effect as a means of escape from unpleasant reality.
15. It constitutes an important community health problem.

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CHEMISTRY

New Oxy-Nitro-Fluorine Gas Is Irritating, Explosive

Warfare Use Considered Doubtful by Chemists Since Instability Makes it Unsafe to Handle

A NEW chemical substance, potentially an irritating war gas like phosgene, has been discovered at Massachusetts Institute of Technology. At the Cleveland meeting of the American Chemical Society, Dr. George H. Cady, chemist now employed by the United States Rubber Company, reported on a new compound of fluorine extremely explosive, and irritating to the lungs in a fashion similar to the war gas phosgene. The gas, never before known, was produced in a laboratory accident at Massachusetts Institute of Technology last May.

Starts Coughing

Dr. Cady said: "When one inhales a small amount of the compound one starts to cough. A deep breath, even of fresh air, taken after a coughing spell produces still more irritation of the lungs. In this respect the gas is something like phosgene. A blanket of gas over the enemy's trenches would be destructive to life, and if the concentration were high enough an explosion could easily be produced."

An official statement issued by the American Chemical Society added:

"Dr. Cady's discovery attracted unusual interest among chemists in view of rumors reaching this country of new war gases developed in the laboratories of Europe and the possibility of utilizing certain known gases in warfare. Definite knowledge of such developments, however, appear to be lacking."

The accidental creation of the new fluorine compound resulted in a substance whose molecules consist of one atom of nitrogen, three atoms of oxygen and one atom of fluorine. The gas has the treacherous property of exploding violently when heated.

"I first learned of the explosive tendency of the gas quite suddenly," Dr. Cady's report stated, "when a large flask I was holding blew up. After that, the compound was prepared in a piece of apparatus something like a gun. The reaction of fluorine with nitric acid occurred in the barrel, and occasional ex-

plosions simply blew a metal disk away from the muzzle, doing no damage.

"At present no one can predict the future industrial importance of gaseous fluorine or compounds directly derived from it. It seems probable, however, that research of a purely scientific nature will create a demand for the commercial production of fluorine, and the free element may eventually occupy a position equal to that of the other halogens, chlorine, bromine and iodine."

Minimizing the possible wartime uses of newly discovered gases, Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*, declared:

"I think it is fair to say that to the best of our knowledge and belief, research since the war has failed to disclose any gases for field use that are more advantageous than those known and used during the World War."

Not only must a war gas or an explosive be destructive but it must do its damage when—and only when—it is desired. It must hurt the enemy but not the homeland forces. Dr. George H. Cady in reporting on his new fluorine compound declared that only when the violent instability of the compound has been overcome will the new gas be useful in war.

Not Safe Enough

While the compound may find industrial uses, its present status as a war gas can be compared to the frequent announcements of the discovery of super-explosives more powerful than dynamite or TNT. In most cases such substances give violent explosions but are unsuitable for general use because they blow up on the slightest provocation, either from heat or shaking. Not only must an explosive or gas give violent reactions but it must be capable of being handled safely even by unskilled labor.

Massachusetts Institute of Technology officials declared that no chemical research conducted in their laboratories

is designed either directly or indirectly to develop warfare gases. The statement was forthcoming in a reply to a Science Service query.

"No research here is directly or indirectly designed to develop warfare gases," said Dr. Frederick G. Keyes, head of the M. I. T. department of

chemistry. "Dr. George H. Cady long has been working on fluorine compounds on a purely scientific basis. The fact that this and many commonly used gases are poisonous is no indication whatever that they are developed for warfare."

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PUBLIC HEALTH

Dysentery Is Threatening Health of the Nation

AMEBIC dysentery continues to threaten the health of the American people, in the opinion of Dr. F. W. O'Connor of Columbia University who pointed out the importance of tropical diseases in the United States at the meeting of the American Public Health Association at Pasadena.

"In the future greater attention should be paid to the question of amebic dysentery because the usual number of carriers of the parasite in this country has doubtless been augmented by a number of persons in different parts of the states who became carriers as the result of the Chicago outbreak but did not develop symptoms," Dr. O'Connor explained.

From six to twelve million persons in the United States are subjects of this disease, Dr. Alfred C. Reed of the University of California Medical School gave as an estimate.

Two-Fold Danger

The danger from carriers of amebic dysentery is two-fold, Dr. O'Connor pointed out. Not only are they probably spreading the disease to others who may become seriously ill but the carriers themselves may at any time develop the disease in malignant form. Development of liver abscess as a result of amebic dysentery infection is a particularly grave complication which threatens the so-called healthy carrier and the apparently cured case, Dr. O'Connor said. He emphasized the danger of relapse in patients who had been treated and apparently cured of the disease.

The recent epidemic in Chicago shows that the very progress of mankind may not only bring new evils in its train but may upset the biological balance between parasite and man, Dr. O'Connor said.

The Chicago epidemic was traced to sewage contamination of drinking water in two hotels as a result of faulty plumbing. But such conditions probably exist in other cities. Outbreaks of amebic dysentery as severe as the one in Chicago last year may occur in other parts of the country at any time, especially under conditions of guest strain such as large conventions bring, Dr. O'Connor said.

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ENGINEERING

Super-Power System For Great Britain

A PROPOSAL to link all the electrical generation plants of Great Britain into one super-power system is advanced by Prof. Francis G. Bailey. The scheme would make possible the use of the lowest grade coal and other forms of cheap power now wasted.

The cities of England, Prof. Bailey declared, are admirably adapted to such a plan for "to a large extent, the population has gathered around the coal pits, and there are practically no large towns, except seaports, that do not lie within easy reach."

The new plan calls for the use of the lowest grade and waste coal which now amounts to about 10 per cent. of all the coal raised in England. At present the waste coal must be used—if it is used at all—at or near the mines. A small part of it is employed to generate power for running the mines but much of it is burned, for this is the cheapest way to get rid of it.

Shipping such low grade coal to a point where it might better be used is uneconomical for it costs just as much to transport it as high grade coal and yet its heat-producing value is small.



ONE FOR EVERY PURPOSE

The meticulous golfer with his big bag of carefully matched sticks, one for every imaginable kind of lie, has nothing on this dusky Goajira Indian, of Colombia. No two of his arrows are alike, yet each is excellently adapted for a particular type of game—including human targets. Photo by A. J. Weston.

Under Prof. Bailey's plan such low grade coal would be turned into electrical power at the mine head or at the place where coal is cleaned, and then sent over high-voltage transmission lines to all points. It is three times as cheap to transmit electrical power as it is to ship coal from which an equal amount of power may be derived, Prof. Bailey points out.

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NEW INDUSTRIES FOR OLD

an address by

Dr. E. R. Weidlein

Director, Mellon Institute of Industrial Research

Wednesday, Sept. 19, at 3:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

PLANT PATHOLOGY

"Action Now" Imperative, As Elm Disease Menace Grows

ELMS by the thousand have been afflicted this summer by the so-called Dutch elm disease, which made a second entry into this country only last year, in the region around New York harbor. In the summer of 1933, elm disease scouts found about 800 afflicted trees; one year later the number had swelled to approximately 6,800. "Action, and action now," is absolutely necessary if all the beautiful elms of America are not to be wiped out.

This is the gist of an address on the Dutch elm disease by Dr. S. B. Fracker of the bureau of entomology, U. S. Department of Agriculture, given under the auspices of Science Service.

Like Medieval Pestilence

Dr. Fracker's roll of tree deaths in the cities of Europe, after the disease was first noted in Holland during the World War, was almost like an account of a medieval pestilence among human beings. All the majestic rows of elms in the famous park at Versailles dead and cut down; 2,000 elms destroyed in the region around Bremen, Germany; 17,000 elms killed in Rotterdam, Holland—the list is almost endless and wholly appalling.

Drastic means alone can save American elms, Dr. Fracker indicated: "The only practical basis of safeguarding the healthy elms is a complete eradication

of the disease by searching out and destroying the infected trees before the disease spreads to other trees. The obvious symptoms of the disease in a tree are evident during the growing season for six to ten weeks before the bark beetles in the bark can mature and emerge to spread the disease. This makes it possible to locate and destroy the affected trees and thus prevent its dissemination by these beetles. It is evident therefore that if the disease is principally transmitted by these bark beetles, as is now strongly indicated, eradication is both practicable and feasible providing the required work is done promptly and persistently."

Next year will be a critical period in the campaign to drive out this new invading enemy from American territory. In spite of the seriousness of the situation, Dr. Fracker refused to be downhearted. He continued:

Can Be Eradicated

"This country has proven in several other similar campaigns that a new plant disease or a new insect arriving within our midst can be completely wiped out, if the effort is vigorous enough and the resources adequate for the job on hand. We believe that the Dutch elm disease can be eradicated from the United States and the elms of America protected from the disaster which has overtaken those of Europe

if the diseased trees of the New York, New Jersey and Connecticut area can be found and destroyed fast enough and if the work can be continued until the last trace of this fungus is destroyed."

Dr. Fracker's talk was put on the air over the network of the Columbia Broadcasting System.

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CHEMISTRY

Chameleon "Watchdogs" Serve to Guard Gasoline

CHEMICAL "watchdogs" known technically as inhibitors, whose function it is to protect gasoline from deterioration, now change their color when their protective ability weakens.

Drs. C. D. Lowry, Jr., C. G. Dwyer, Gustav Egloff and J. C. Morrell of the Universal Oil Products Company reported to the American Chemical Society that it is possible to use certain dyes as inhibitors for decreasing gasoline deterioration. With age the gasoline "guardians" weaken, but at the same time their color fades. Thus chemists are able to tell when the inhibitory chemicals are so weak that they must be replaced.

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METEOROLOGY

Wet Autumn May Follow Droughty Summer

DROUGHT and heat, twin scourges that afflicted Midwestern states during the summer, may be followed by the blessing of abundant rain in September and October. They will, if statistical correlations between early-season high temperatures and autumnal rainfall, as worked out by Charles D. Reed of the U. S. Weather Bureau at Des Moines, Iowa, continue to hold good.

Mr. Reed has found that over a long period of years warm Januarys, Mays, and Julys have been followed by above-normal rainfall in September, and that warm Augusts have been similarly followed by above-normal rainfall in October. His studies have been confined to temperatures and rainfall for the state of Iowa as a whole; but since the climate of the corn belt is more or less of a unit, what is true for Iowa should hold good, at least to some extent, for the Midwest generally.

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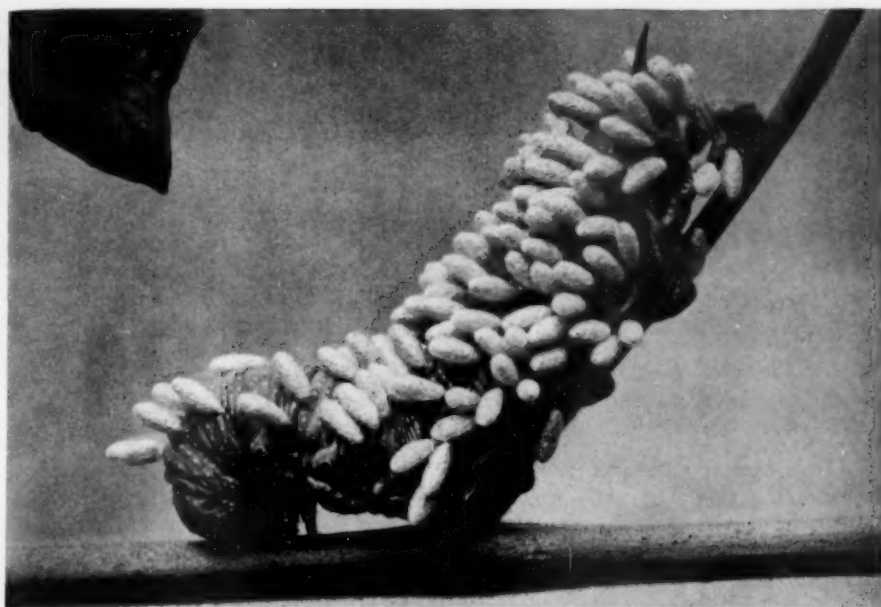
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A MANIFOLD BURDEN OF DEATH.

No moth will ever develop from this fat tomato-worm; some enterprising parasitic insect has seen to that. The packets with which his body is thickly covered are the cocoons of its young, which will suck the luckless caterpillar empty. Photo by Cornelia Clarke.

ARCHAEOLOGY

Ancient Egypt Knew Immigrant Tides From North

EVIDENCE that ancient Egypt actually received repeated waves of immigrants from the Caucasus, a thousand miles away, is discovered by Sir Flinders Petrie, noted Egyptologist of England.

It has been speculated by various scientists that the Egyptian race may have included blood of immigrants from this distant region to the northeast, on the shores of the Caspian Sea. In the Book of the Dead, sacred religious writing of Egypt, Sir Flinders some time ago found many place names which strikingly matched geographic names in the Caucasus and fitted into relative positions there.

The blessed fertile land of the Egyptian dead was the valley of Iaru; in the middle of the Caucasian valley was a real fertile place called the Iora.

The Egyptian blessed valley was said to contain lakes of fire; and in the Caucasian valley were real lakes of fire in the form of petroleum springs.

The capital of the Egyptian god of the dead, Osiris, was given the name Akret; the Greek capital of the Caucasus was Ekretike.

Such parallels, in Sir Flinders estimation, built a strong case, but an incredible one.

Now he reports to *Nature* that his excavations at Gaza have yielded ribbed daggers, typical of the Caucasus, and a multitude of toggle-pins with spiral or ribbed stems, typical of the same region. With this evidence in hand, he is ready to conclude that there were indeed migrations.

"This material," he declares, "opens our eyes to six migrations from the Caspian basin to Egypt."

The earliest of the six waves of southward immigration he places in the Badarian Age, or the very dawn of Egypt's civilization. The latest he places at the time of Saladin, medieval Mohammedan conqueror.

Gaza, where the Caucasian type articles have been found, lies not in Egypt but in southern Palestine. Gaza's history, however, was closely knit with that of Egypt. Sir Flinders' explorations there have revealed that Gaza was a great city of the Hyksos, the warrior horsemen who pushed their way down

from Syria until at length—about 1600 B.C.—they succeeded in exalting themselves as the Shepherd Kings of Egypt. It was in a palace courtyard of the Hyksos that the toggle-pins and daggers were unearthed. The Shepherd Kings have always been a mysterious set of conquerors. It now appears that they came, originally, from the Caucasus, moving west to Syria and then south on their conquering way which ended in Egypt.

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NATIONAL PARKS

Rainier, Once Volcano, Now Flower-Wreathed

See Front Cover

M T. RAINIER, of late familiarized more than ever to the American public through its use on the three-cent postage stamp of the new National Parks series, once held fire within, and now holds ice and flowers without. This stately symmetrical peak, towering more than 14,000 feet over the valleys of the Pacific Northwest, is a volcano. It has shown no signs of fiery activity during the white man's acquaintance with it, though there is an Indian tradition of a great outburst long ago.

Of such commanding height, and so directly in the track of moist coastal westerlies, Rainier is bound to bring down upon its head vast quantities of snow. This snow is responsible for two of the mountain's great beauties: solidified into fields of ice, it feeds the twenty-eight glaciers that forever creep down the slopes; melted into water, it makes possible the marvelous gigantic chaplet of flowers, two miles wide and fifty miles in circuit, that crowns the mountain between timber-line and snow-line.

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VITALISM and MECHANISM A DISCUSSION

between

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and

JAMES F. PORTER

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●First Glances at New Books

Education—Ethnology

EDUCATION OF PRIMITIVE PEOPLE—Albert D. Helser—*Revell*, 316 p., \$3. Of unusual interest for educators is this book by a man who has worked out a practical and effective program for teaching a primitive people. In his Mission School in Nigeria we find the project method, so popular now among educators, applied to the teaching of lessons on health, agriculture, home life, and good clan citizenship in Africa. Dr. Helser objects to uprooting local culture, and replacing it with something strange and new. He aims, rather, to build on the familiar patterns of life to make an educated native. His methods of teaching African school children offer many ideas adaptable in teaching other young primitives, or even the children of civilization.

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Photography

MODERN PHOTOGRAPHY, 1934-35—C. Geoffrey Holme, ed.—*Studio Publications*, 32 p., 96 plates, cloth, \$3.50; paper, \$2.50. Again comes a selection of the best photographs of a year's crop all over the world: babies and puppies, nudes and gnarled old men, machines, city streets, waterfalls, trees—the thousand subjects under a score of treatments that keeps always new one's wonder at the sensitive, flexible instrument of expression which the modern photographic camera has become.

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Genetics

GÉNÉTIQUE ET ÉVOLUTION, ANALYSE DE QUELQUES ÉTUDES MATHÉMATIQUES SUR LA SÉLECTION NATURELLE—Ph. L'Héritier—*Hermann et Cie.*, Paris, 43 p., 14 francs.

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Forestry

IDENTIFICATION OF THE COMMERCIAL TIMBERS OF THE UNITED STATES—Harry P. Brown and Alexis J. Pan-shin—*McGraw-Hill*, 223 p., \$3.00. This is distinctly a practical book as well as a student's book, for its identifications are based not primarily on compound-microscope determinations of minutiae but on things you can see with the naked eye or at most with a hand lens. The minute characters do receive their proper consideration, however, and are shown up in a wealth of beautifully reproduced photomicrographs.

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Medicine

DISEASE PECULIAR TO CIVILIZED MAN—George Crile—*Macmillan*, 427 p., \$5.00. Dr. Crile here presents the thesis that certain diseases, such as diabetes, peptic ulcer and epilepsy, are related diseases and result from the tension of highly civilized life, which causes a disturbance of the glandular and autonomic nervous system, particularly the adrenal glands.

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Zoology

MANUAL OF THE VERTEBRATE ANIMALS OF NORTHEASTERN AND CENTRAL CHINA—Cora D. Reeves—*Chung Hwa Book Co.*, Shanghai, 806 p., \$4.50, plus postage. This book represents a most admirable pioneer effort to make available a systematically arranged, "keyed" description of all the vertebrates, save birds, of a highly important faunal area where nothing whatever of this kind has ever been done before. The author states that in the compilation she has gathered material "which was first published two hundred or more years ago or less than a month ago," and in half-a-dozen European languages. It should be a godsend to struggling teachers in Chinese schools, and highly useful as well to people "outside" who have Chinese zoological material to puzzle over. Cleanly printed and well bound, the book is a credit also to the Chinese publishing industry.

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Archaeology—Ethnology

INDIAN LIFE OF LONG AGO IN THE CITY OF NEW YORK—Reginald Pelham Bolton—*Joseph Graham*, 167 p., 31 pl., \$4. This sort of book might well be written about the Indians in various parts of the country, so that school children, teachers, and other local inhabitants might know more about the Indian people who once lived in their neighborhood. Mr. Bolton has studied Indians of New York for more than thirty years, and he writes simply and informatively. His drawings of Indian weapons, houses, and other subjects are a fine feature of the book.

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History—Geography

THE EXPLORATION OF WESTERN AMERICA, 1800-1850—E. W. Gilbert—*Macmillan*, 233 p., \$3.75. Relates in considerable detail, drawing freely on original accounts, the stories of the classic expeditions of Lewis and Clarke, of Pike, Frémont, "Jim" Bridger, and all the other heroic adventurers great and small who pushed into the West in the first years of the nineteenth century, when it was as unknown as the interior of Borneo is today, and as dangerous to enter.

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Agriculture

CHANGE IN THE FARM—T. Hennell—*Macmillan*, 201 p., \$3.75.—The author reconstructs vividly and with realistic detail farm life as it used to be lived in England—only a couple of generations ago, before the coming of modern machinery, and before the competition of new lands overseas had driven much of the less productive English land back into grass. Even while one pities in retrospect the endless aching muscles that must have gone with scythe and flail and all the other implements of the old hand labor, one perforce admires the ingenuity and simplicity with which that generation of farmers faced and solved their problems with only the most elementary material resources.

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Radio

REPORT OF RADIO RESEARCH IN JAPAN, VOL. IV, NO. 1. *National Research Council of Japan, Tokyo*, 62 p.

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Science

THE NEW WORLD OF SCIENCE—A. Frederick Collins—*Lippincott*, 308 p., \$2.50.—Book that tries to take the reader to the Century of Progress without spending the carfare. The author concentrates on the exhibits in the Hall of Science, principally the inventions. Much the same information can be obtained from the companies which manufacture the equipment exhibited.

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